

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
15 September 2005 (15.09.2005)

PCT

(10) International Publication Number  
**WO 2005/084211 A3**

(51) International Patent Classification<sup>7</sup>: **F16K 31/00**

(21) International Application Number:  
PCT/US2005/005963

(22) International Filing Date:  
25 February 2005 (25.02.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/548,563 27 February 2004 (27.02.2004) US

(71) Applicant (for all designated States except US): **ALUMINA MICRO LLC** [US/US]; 1971 Midway Lane, Suite J, Bellingham, WA 98226 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **FULLER, Edward, Nelson** [US/US]; 17750 Sharon Valley Road, Manchester, MI 48158 (US).

(74) Agent: **SHAH, Shital, A.**; MacMillan Sobanski & Todd LLC, One Maritime Plaza, 4th Floor, 720 Water Street, Toledo, OH 43604 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

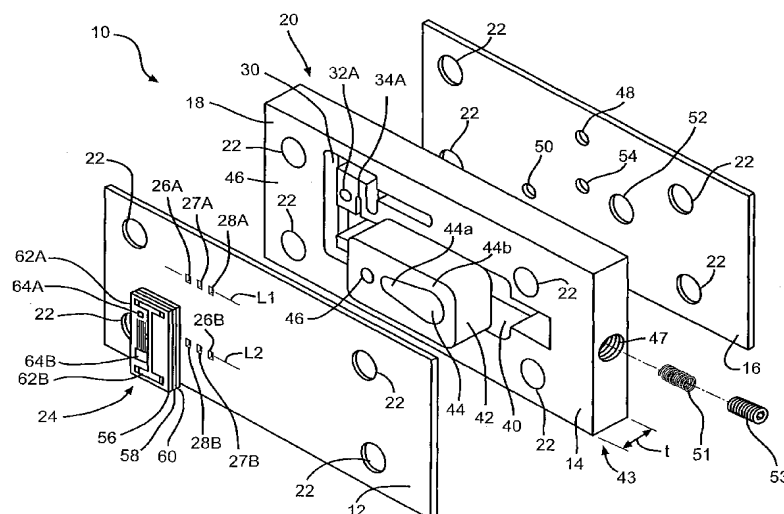
- with international search report
- with amended claims and statement

(88) Date of publication of the international search report:  
12 January 2006

Date of publication of the amended claims and statement:  
16 February 2006

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **HYBRID MICRO/MACRO PLATE VALVE**



(57) Abstract: A microvalve device includes a pilot valve and a pilot operated valve. The pilot valve includes a first layer having openings and a second layer having a chamber in communication with the openings, and a movable member for controlling fluid flow. The pilot operated valve includes three plates. Two the openings, and pressure apply and release channels in communication with a spool portion of the pilot operated valve. The spool is movable to allow from a second fluid source to a load. The third plate includes a first source port in communication with a first fluid, the pressure apply and release channel, one of the first plate ports, one of the openings, a first port in communication with a first reservoir, a second port is in communication with the second fluid source and a load port in communication with a load.

WO 2005/084211 A3